

REMARKS

Claims 1 and 9 are amended to more particularly point out that the encapsulant has sides perpendicular to the substrate, as shown in Fig. 1.

Claims 10-19 are cancelled pursuant to the Restriction Requirement, subject to Applicants right to pursue the claims in a divisional application.

The amendments merely clarify the claims by reciting a feature that is known in the molded body called for in the claims, and so do not add new matter or raise new issues. In the event that the amendments are not deemed to place the claims in condition for allowance, it is nevertheless requested that the amendments be entered, if for no other reason than to clarify issues for purposes of appeal.

Objection to Claim 3

In response to an objection, claim 3 is amended to correct a typographical error. In view of the Amendment, it is respectfully requested that the objection be withdrawn.

Claim Rejection based upon Glenn et al. and Chason et al.

Claims 1, 3-6, and 8-9 were rejected under 35 U.S.C. § 103 as unpatentable over United States Patent No. 6,571,466, issued to Glenn et al. in 2003, in view of United States Patent No. 6,800,946, issued to Chason et al. in 2004.

Applicants' microelectronic assembly comprises a molded polymeric body that overlies the rear face and has sides perpendicular to the substrate. Further, the encapsulant extends into the gap between the active face and the substrate, to define the optical window. Glenn et al. discloses a package that includes a bead 116 at the perimeter of the sensor 104, as shown in Fig. 2. The rejection points to col. 10, lines 47-48, that the bead may contact the periphery of the upper surface 104U of the sensor, or may "entirely contact" the upper surface. The practitioner would understand that the description results from a glob of excess material applied in forming the bead, in which case excess material flows onto the upper surface. Such a process forms convex sides, as shown in Glenn et al. However, Glenn et al. does not lead the practitioner to inject polymeric material under pressure to encapsulate the sensor, the rejection does not contend that it does. Thus, Glenn et al. does not point to Applicants' invention.

The rejection contends that "molded" is a process limitation that may be ignored in assessing patentability. However, the practitioner is familiar with molded encapsulants and is readily able to distinguish them from a bead applied to the periphery, even if formed with excess material that flows onto the upper surface. Thus, it is entirely permissible to refer to a molded body as a distinctive element of Applicants' assembly, since the practitioner can readily identify the molded body and distinguish it from the prior art, including the bead in Glenn et al.. Nevertheless, in an effort to further prosecution, the amendments presented herein clarify that a molded body has perpendicular sides, a feature distinctive for a molded encapsulant and not formed in the

bead in Glenn et al.

Nor does Chason et al. make up the deficiencies. Chason et al. shows underfill material 240 that is pre-applied so as to be limited to the gap between flip chip 210 and board 230, see Fig. 2. The underfill material is drawn onto the surface of the board, resulting in the curved periphery shown in Fig. 2. Chason et al. does not point to a body that encapsulates the chip, or to a body that is molded, or to a body having perpendicular sides. Thus, even if combined with Glenn et al., there is nothing in the references to lead the practitioner to a molded encapsulant extending over the upper face and having perpendicular sides, and further defining an optical window between the die and the substrate, as in Applicants' invention.

Claim 1 is directed to Applicants' assembly that includes an optical window defined by a polymeric encapsulant that is a molded body. The molded body overlies the rear face of the die and has perpendicular sides. It is clear from a reading of the references that neither Glenn et al. nor Chason et al. contemplate a molded body to encapsulate the sensor or the chip. Rather, Glenn et al. applies a bead having a convex periphery, clearly not molded. Chason et al. uses a pre-applied layer and forms a curved perimeter, also clearly not molded. Thus, the references do not teach or suggest Applicants' assembly in claim 1.

Claims 3-6 and 8 are dependent upon claim 1 and so not suggested by the references at least for the reasons set forth above.

Claim 9 is directed to Applicants' preferred assembly and calls for overmolded polymer encapsulant overlying the rear face of the die and defining the optical window. For the reasons herein, the references do not show the assembly in claim 9.

Accordingly, it is respectfully requested that the rejection of the claims based upon Glenn et al. and Chason et al. be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection based upon Glen et al., Chason et al. and Gonzalez et al.

Claim 7 was rejected under 35 U.S.C. § 103 as unpatentable over Chason et al. in view of United States Patent Application Publication 2003/0080437, by Gonzalez et al. Also, claim 7 was rejected under 35 U.S.C. § 103 as unpatentable over Glenn et al. and Chason et al. in view of Gonzalez et al.

Claim 7 is dependent upon claim 1. For the reasons discussed above, Chason et al. shows pre-applied encapsulant, whereas Glenn et al. shows an encapsulant bead. Thus, neither shows a molded encapsulant body, a key feature of Applicants' invention.

Gonzalez et al. describes an encapsulant having a CTE within a preferred range for Applicants' invention. However, Gonzalez et al. does not disclose an overmolded assembly having an optical window, and so cannot suggest that the flow of material can be limited during an overmolding process to define a window. Accordingly, even if the

material is suitable as a pre-applied layer as in Chason, or as a bead as in Glenn et al., there is nothing in the references to point the practitioner to overmolding encapsulant to define a window to form an assembly as set forth in claim 1 and included in claim 7.

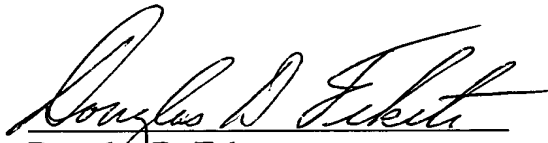
Accordingly, it is respectfully requested that the rejection of claim 7 based upon Glenn et al., Chason et al. and Gonzalez et al. be reconsidered and withdrawn, and that the claim be allowed.

Conclusion

It is believed, in view of the amendments and remarks herein, that all grounds of rejection of the claims have been addressed and overcome, and that all claims are in condition for allowance. If it would further prosecution of the application, the Examiner is urged to contact the undersigned at the phone number provided.

The Commissioner is hereby authorized to charge any fees associated with this communication to Deposit Account No. 50-0831.

Respectfully submitted,

A handwritten signature in cursive script, reading "Douglas D. Fekete", written over a horizontal line.

Douglas D. Fekete

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